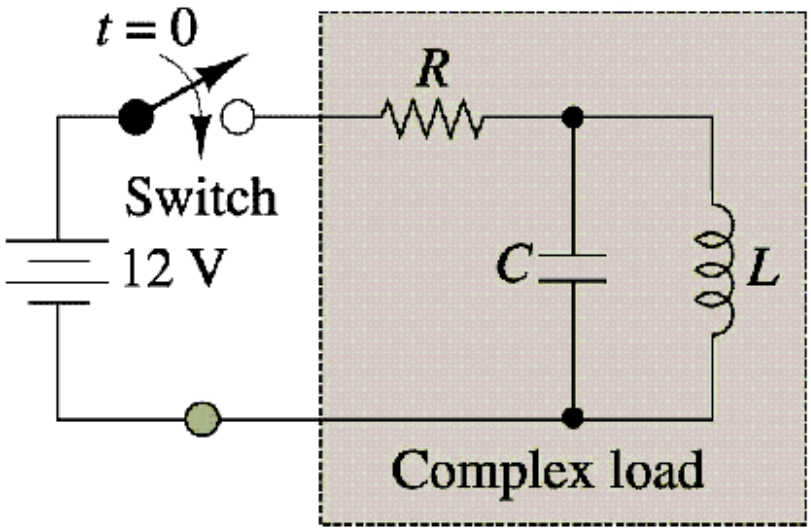
NETWORK ANALYSIS AND SYNTHESIS

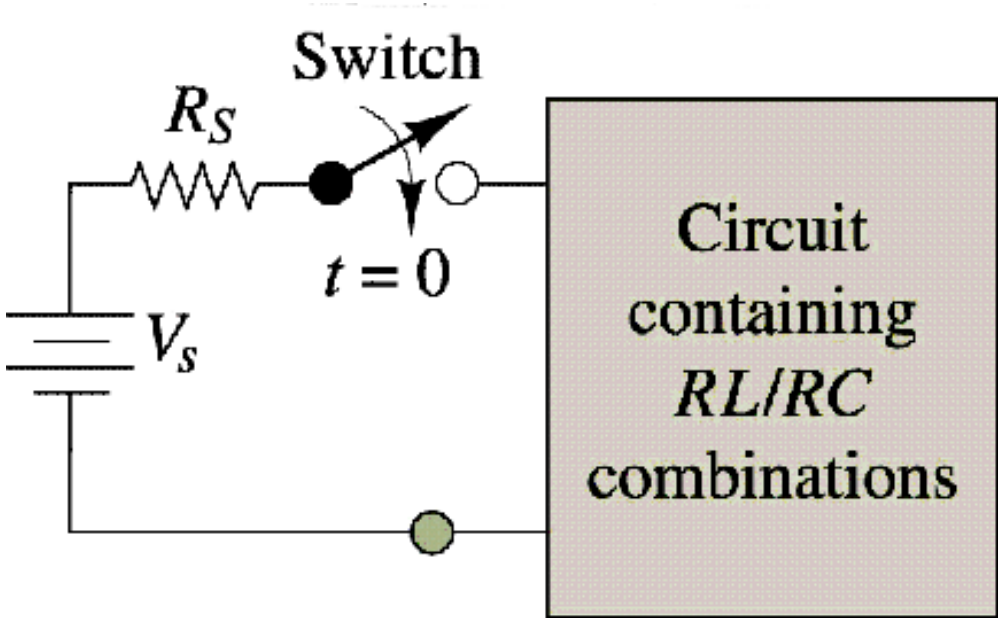
Unit – III
Transient Circuit Analysis

- Natural response and forced response,
- Transient response and steady state response for arbitrary inputs (DC and AC),
- Evaluation of time response both through classical and Laplace methods.

Circuit with switched DC excitation



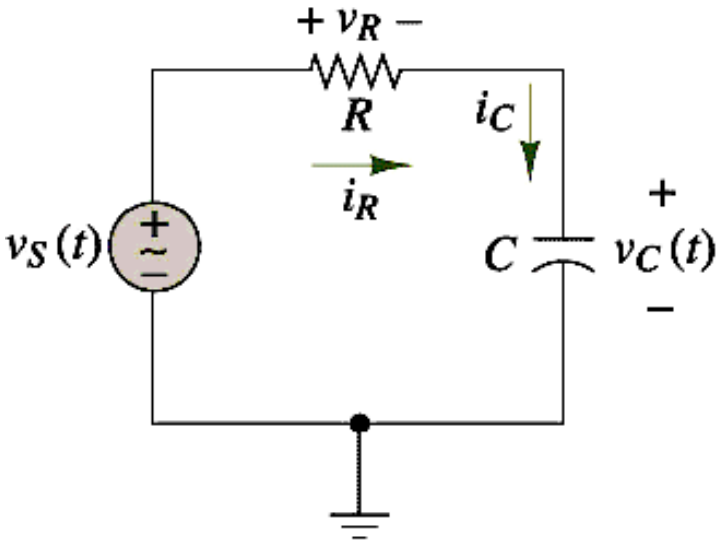
A general model of the transient analysis problem

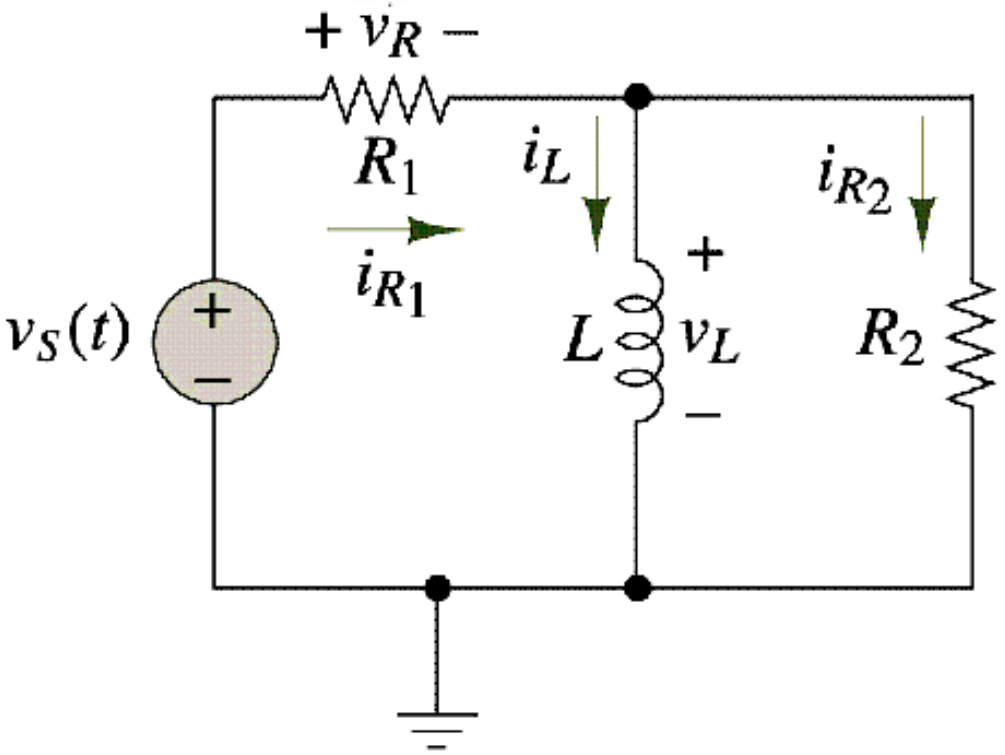


In general, any circuit containing energy storage element

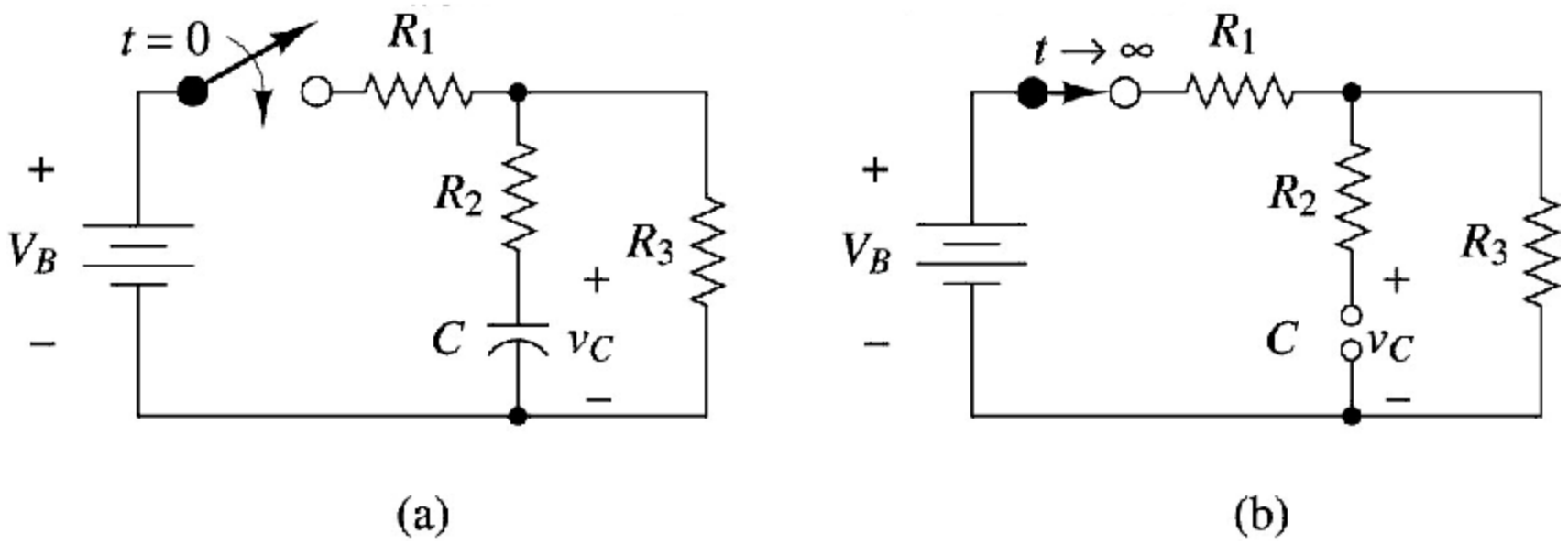
A circuit containing energy-storage elements is described by a differential equation. The differential equation describing the series *RC* circuit shown is

$$\frac{di_C}{dt} + \frac{1}{RC} i_C = \frac{dv_S}{dt}$$



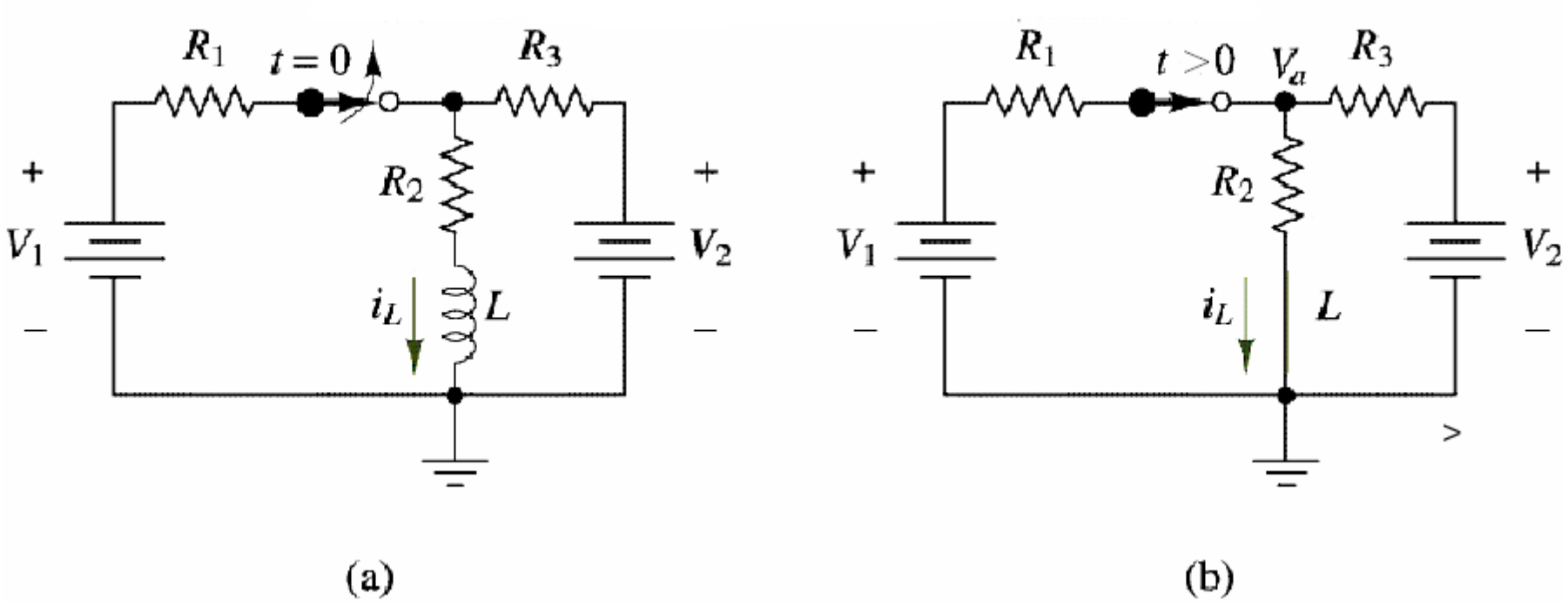


(a) Circuit at t = 0
(b) Same circuit a long time after the switch is closed



The capacitor acts as open circuit for the steady state condition (a long time after the switch is closed).

(a) Circuit for t = 0
(b) Same circuit a long time before the switch is opened



The inductor acts as short circuit for the steady state condition (a long time after the switch is closed).

THANKS….

Queries Please…